What is claimed is:

1. A method for modulating growth, differentiation, or survival of a cell comprising contacting said cell with an effective amount of a *hedgehog* polypeptide.

2. A method for modulating one or more of growth, differentiation, or survival of a mammalian cell responsive to *hedgehog* induction, comprising treating the cell with an effective amount of a *hedgehog* polypeptide thereby altering, relative to the cell in the absence of *hedgehog* treatment, at least one of (i) rate of growth, (ii) differentiation, or (iii) survival of the cell.

3. The method of claim 2, which polypeptide mimics the effects of a naturally-occurring *hedgehog* protein on said cell.

4. The method of claim 2, which polypeptide antagonizes the effects of a naturally-occurring *hedgehog* protein on said cell.

5. The method of claim 2, which polypeptide comprises an amino acid sequence identical or homologous to an amino acid sequence designated in one of SEQ ID No:8, SEQ ID No:9, SEQ ID No:10, SEQ ID No:11, SEQ ID No:12, SEQ ID No:13 or SEQ ID No:14.

6. The method of claim 5, which polypeptide is a bioactive fragment of a *hedgehog* polypeptide.

7. The method of claim 2, which polypeptide comprises an amino acid sequence identical or homologous to an amino acid sequence designated in SEQ ID No:34.

8. The method of claim 2, wherein the cell is a testicular cell, and the polypeptide modulates spermatogenesis.

9. The method of claim 2, wherein the cell is an osteogenic cell, and the polypeptide modulates osteogenesis.

10. The method of claim 2, wherein the cell is a chondrogenic cell, and the polypeptide modulates chondrogenesis.

11. The method of claim 2, wherein the polypeptide modulates the differentiation of neuronal cells.

12. The method of claim 11, which neuronal cells are selected from the group consisting of motor neurons, cholinergic neurons, dopanergic neurons, serotenergic neurons, and peptidergic neurons.

13. The method of claim 11, wherein the polypeptide promotes survival of the neuronal cells.

14. A method for modulating, in an animal, cell growth, cell differentiation or cell survival, comprising administering a therapeutically effective amount of a *hedgehog* polypeptide to alter, relative the absence of *hedgehog* treatment, at least one of (i) rate of growth, (ii) differentiation, or (iii) survival of one or more cell-types in the animal.

15. The method of claim 14, which polypeptide mimics the effects of a naturally-occurring *hedgehog* protein on cells in the animal.

16. The method of claim 14, which polypeptide antagonizes the effects of a naturally-occurring *hedgehog* protein on cells in the animal

17. The method of claim 14, which polypeptide comprises an amino acid sequence identical or homologous to amino acid sequence designated in one of SEQ ID No:8, SEQ ID No:9, SEQ ID No:10, SEQ ID No:11, SEQ ID No:12, SEQ ID No:13, SEQ ID No:14, SEQ ID No. 34, SEQ ID No. 40, SEQ ID No. 41, or homologs thereof.

18. The method of claim 17, which polypeptide is a bioactive fragment of a *hedgehog* polypeptide.

19. The method of claim 14, which method modulates spermatogenesis in the animal.

20. The method of claim 14, which method modulates osteogenesis in the animal.

21. The method of claim 14, which method modulates chondrogenesis in the animal.

22. The method of claim 14, which method modulates differentiation of neuronal cells in the animal.

23. A method for inducing a cell to differentiate to a neuronal cell phenotype, comprising contacting said cell with a *hedgehog* polypeptide.

24. The method of claim 23, which polypeptide comprises an amino acid sequence identical or homologous to amino acid sequence designated in one of SEQ ID No:8, SEQ ID No:9, SEQ ID No:10, SEQ ID No:11, SEQ ID No:12, SEQ ID No:13, SEQ ID No:14, SEQ ID No. 34, SEQ ID No. 40, SEQ ID No. 41, or homologs thereof.

25. The method of claim 24, which polypeptide is a bioactive fragment of a hedgehog polypeptide.

26. The method of claim 23, wherein said neuronal cell phenotype is selected from the group consisting of motor neurons, cholinergic neurons, dopanergic neurons, serotenergic neurons, and peptidergic neurons.

27. A method of modulating skeletogenesis comprising contacting a target tissue with an effective amount of a *hedgehog* polypeptide so as to cause one or both of chrondrogenesis and oseteogenesis in the target tissue.

28. The method of claim 27, wherein said target tissue is selected from the group consisting of bone, connective tissue and a combination thereof.

29. A method for treating a degenerative disorder of the nervous system characterized by neuronal cell death, comprising administering to a patient a therapeutically effective amount of a pharmaceutical preparation of a *hedgehog* polypeptide thereby causing, relative to the absence of *hedgehog* treatment, prolonged survival of neural cells in said patient.

30. The method of calim 29, wherein said *hedgehog* polypeptide comprises an amino acid sequence identical or homologous to a polypeptide selected from the group consisting of SEQ ID No:8, SEQ ID No:9, SEQ ID No:10, SEQ ID No:11, SEQ ID No:12, SEQ ID No:13, and SEQ ID No:14, or is a bioactive fragment thereof.

31. The method of calim 29, wherein said *hedgehog* polypeptide comprises an amino acid designated in SEQ ID No. 41.

32. The method of calim 29, wherein said *hedgehog* polypeptide comprises an amino acid identical or homologous to SEQ ID No. 34, or a bioactive fragment thereof.

33. The method of claim 29, wherein said therapeutically effective amount of *hedgehog* polypeptide inhibits the de-differentiation of neural cells of said patient.

34. The method of claim 33, wherein said neural cell is a glial cell.

35. The method of claim 33, wherein said neural cell is a nerve cell.

36. The method of claim 29, wherein said degenerative disorder is a neuromuscular disorder.

37. The method of claim 29, wherein said degenerative disorder is a autonomic disorder.

38. The method of claim 29, wherein said degenerative disorder is a central nervous system disorder.

39. The method of claim 29, wherein said degenerative disorder is selected from a group consisting of Alzheimer's disease, Parkinson's disease, amyotrophic lateral sclerosis, Pick's disease, Huntington's disease, multiple sclerosis, neuronal damage resulting from anoxia-ischemia, neuronal damage resulting from trauma, and neuronal degeneration associated with a natural aging process.

40. The method of claim 29, further comprising administering to said patient a therapeutically effective amount of a growth factor having neurotrophic activity.

41. The method of claim 40, wherein said growth factor is selected from a group consisting of a nerve growth factor, cilliary neurotrophic growth factor, schwanoma-derived growth factor, glial growth factor, striatal-derived neuronotrophic factor, platelet-derived growth factor.

Add J1

add B1

add C

add D12

add H8

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